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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/673,180

09/30/2003

Toshio Tsujimoto

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02/26/2009

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ALEXANDRIA, VA 22314

EXAMINER

SONG, MATTHEW J

ART UNIT

PAPER NUMBER

1792

NOTIFICATION DATE

DELIVERY MODE

02/26/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<i>Office Action Summary</i>	Application No.	Applicant(s)	
	10/673,180	TSUJIMOTO ET AL.	
	Examiner	Art Unit	
	MATTHEW J. SONG	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2008.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 35-48 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/8/2008</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/1/2008 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 44 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 44 recites, "a density of silica glass powder layer is more than 1mg/cm²" in lines 1-2. It is unclear how cm² can be used to define density which is a unit of volume, i.e. cm³.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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5. Claims 35 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Brown et al (US 4,713,104).

Brown et al teaches a thick layer of granular quartz particles into a suitable jig shape (crucible) and half of the thickness of the layer of granular quartz particles are melted and fused into quartz glass, this clearly suggests a crucible main body, and the remaining half of the thickness of the layer of remain unfused and unsintered, this clearly suggests an outer coating of silica particles on the whole outside surface of the main body (col 3, ln 1-52).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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7. Claim 35, 37, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakita et al (JP 2000-335998), where an Computer Translation (CT) is provided.

Wakita et al teaches adhering a slurry of silica powder on an outside surface of a quartz crucible (CT [0010]). Wakita et al teaches applying the silica powder to areas in contact with a carbon crucible member (CT [0021]).

Wakita et al does not explicitly teach the whole outside is coated. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Wakita et al by coating the whole outside to be used a carbon crucible which surrounds the quartz crucible. Carbon crucible which surround the quartz crucible are conventional known and taught by Wakita in Fig 4.

Referring to claim 48, Wakita et al teaches a binder layer in which solvent is volatilized from the slurry layer (CT [0024]). Wakita et al does not teach the solvent is an organic substance. It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Wakita et al by using an organic solvent because there is a limited number of selections (organic or inorganic); therefore use of an organic solvent would have been obvious. Furthermore, selection of a known material based on its suitability for its intended purpose is prima facie obvious (MPEP 2144.07); therefore the selection of a organic solvent to act as a solvent would have been obvious to one of ordinary skill in the art at the time of the invention.

8. Claim 35, 37-41 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al (US 5,976,247) in view of Watanabe et al (US 6,106,610).

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Hansen et al discloses a quartz glass crucible comprising a layer of metal oxide, wherein the layer is baked on at least a portion of an inside 26 and outside 24 surface of the silica crucible main body 10 (col 5, ln 10-60; col 7, ln 25-67 and col 8, ln 15-50; and Fig 2). Hansen et al discloses an aqueous solution of barium oxide is used and the solution is sprayed onto a crucible that is heated to 200-300°C, and devitrification promoters create nucleation sites as the crucible is heated to the melt temperature (baking) (col 6, ln 55-57 and col 7, ln 25-65).

Hansen does not teach a silica glass powder layer formed on the whole or in a ring configuration on the outside surface of the crucible main body and/or in a ring configuration on an upper end portion of the inside surface of the crucible main body. However, Hansen et al is not particular about the method used to coat the surface of the crucible.

In a method of forming a crucible, note entire reference, Watanabe et al teaches a crystallization promoter can be used either alone or as a mixture with a powder of synthetic silicon dioxide to form a translucent quartz glass layer. Watanabe et al teaches depositing a synthetic silicon dioxide powder sufficiently impregnated with the aqueous solution, and the layer is formed as a coated film or a solid solution layer on the surface (col 3, ln 30-65 and col 4, ln 1-35), this clearly suggests a silica glass powder layer. Watanabe et al also teaches a crystallization promoter layer is fused to a base body (col 5, ln 5-30). Watanabe et al also teaches a transparent internal quartz layer (col 5, ln 55-67).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Hansen et al by fusing the layer with a crystallization promoter dispersed in a silica matrix (silica powder) to the base body as taught by Watanabe et al, to improve

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adherence and improve safety by reducing the risk of inhalation and ingestion of the promoter ('247 col 7, ln 40-55).

Referring to claim 37-41, the combination of Hansen et al and Watanabe et al teaches coating the entire inner, or the inner except the bottom, coating the outer and coating the outer with the bottom wall uncoated ('629 Figs 1-2; col 5, ln 30-67 and col 7, ln 65-67).

Referring to claim 45, the combination of Hansen et al and Watanabe et al teaches a crystallization promoter layer small than 0.3 mm ('610 col 3, ln 1-45), overlapping ranges are prima facie obvious (MPEP 2144.05).

Referring to claim 46, the combination of Hansen et al and Watanabe et al teaches synthetic silicon dioxide (silica) powder ('610 col 3, ln 30-45).

Referring to claim 47, the combination of Hansen et al and Watanabe et al teaches an internal layer 4 of pure synthetic silicon dioxide ('610 col 5, ln 25-40). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Hansen et al and Watanabe et al by using a synthetic silica have a metal concentration less than 1 ppm to prevent contamination to the contents of the crucible during use. Furthermore, the mere purity of a product, by itself, does not render the product unobvious (MPEP 2144.04).

9. Claim 36, 42-44 and 46-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansen et al (US 5,976,247) in view of Watanabe et al (US 6,106,610), as applied to claims 35, 37-41 and 45-47, and further in view of Loxley et al (US 5,389,582).

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The combination of Hansen et al and Watanabe et al teaches all of the limitations of claim 36, as discussed previously, except Brown et al does not teach the claimed silica particle size.

In a method of forming a porous silica crucible, note entire reference, Loxley et al teaches vitreous silica particles having an average particle size of from 1-8 microns (col 6, ln 1-67), this clearly suggests applicants particle size limitation because 100% of silica particles of less than 10 micrometers meets the claimed limitation. Loxley et al also teaches a particle size not substantially in excess of 10 microns is preferable for slip casting (col 3, ln 45-55).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Hansen et al and Watanabe et al by using silica particles having a particle size from 1-10 microns, as taught by Loxley et al, because the best crucibles are obtained when the particle size ranges are controlled and a range of 1-10 microns is known to produce good crucibles and useful for slip casting ('582 col 6, ln 35-45) and selection of a known material based on its suitability for its intended purpose is prima facie obvious (MPEP 2144.07).

Referring to claim 42, the combination of Hansen et al, Watanabe et al and Loxley et al teaches a particle size not substantially in excess of 10 microns is preferable for slip casting (col 3, ln 45-55), thus suggests coarse silica particles.

Referring to claim 43, the combination of Hansen et al, Watanabe et al and Loxley et al teaches a particle size distribution satisfying the relationship of applicant's claim 36; therefore the particle distribution is expected to enable the control of shrinkage percentage of the silicon glass powder layer to be less than 10% at the time of sintering.s

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Referring to claim 44, the combination of Hansen et al, Watanabe et al and Loxley et al teaches a high density silica glass; therefore clearly suggests a density more than 1 mg/cm².

Referring to claims 46-47, the combination of Hansen et al, Watanabe et al and Loxley et al teaches ultra pure 99.999% synthetic quartz glass ('582 col 3, ln 40-50), thus suggests a alkaline metal concentration of less than 1 ppm.

10. Claims 36, 42-44 and 46-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al (US 4,713,104) as applied to claims 35 above, further in view of Loxley et al (US 5,389,582).

Brown et al teaches all of the limitations of claim 36, as discussed previously, except Brown et al does not teach the claimed silica particle size.

In a method of forming a porous silica crucible, note entire reference, Loxley et al teaches vitreous silica particles having an average particle size of from 1-8 microns (col 6, ln 1-67), this clearly suggests applicants particle size limitation because 100% of silica particles of less than 10 micrometers meets the claimed limitation. Loxley et al also teaches a particle size not substantially in excess of 10 microns is preferable for slip casting (col 3, ln 45-55).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Brown by using silica particles having a particle size from 1-8 microns, as taught by Loxley et al, because the best crucibles are obtained when the particle size ranges are controlled and a range of 1-10 microns is known to produce good crucibles and useful for slip casting ('582 col 6, ln 35-45).

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Response to Arguments

11. Applicant's arguments with respect to claims 35-48 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Werdecker et al (US 2003/0041623) teaches a tamped volume of at least 0.8 g/cm^3 for a transparent silica glass layer of a crucible (Abstract).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. SONG whose telephone number is (571)272-1468. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Kornakov can be reached on 571-272-1303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Matthew J Song
Examiner
Art Unit 1792

MJS
February 17, 2009

/Robert M Kunemund/

Primary Examiner, Art Unit 1792